Derivational and/or representational

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1 What's that

- Generate and filter vs. crash-proof grammar
  - *Free generation and filtering*: Syntactic representations (or derivations) are freely generated. An extensive system of filters assigns status to these representations or to the derivations which produced them. (Frampton, Gutmann 2002)
  - *Highly constrained generation*: Precisely constrained operations iterate to derive a class of representations which are well-formed and interpretable by the interface systems. Output filters play no direct role in the generation process. (Frampton, Gutmann 2002)
- What counts as look-ahead
- Relation to derivation / representation:
  - Very naturally 'generate and filter' goes along with the representational approach, while constrained generation – with the derivational approach.
  - Free generation and filtering presupposes filters that operate on representations.
  - Constrained generation requires at least partial derivationality.
- Note on cyclicity:

(1) *Strict Cycle Condition*: No rule can apply to a domain dominated by a cyclic node α in such a way as to affect solely a proper subdomain of a dominated by a node β which is also a cyclic node. (Chomsky 1973)

  - Strictly speaking, derivational approach doesn't have to be cyclic, but I am not aware of full-fledged attempts to do derivational syntax without cyclicity altogether.
- Some frameworks explicitly combine derivational and representational elements (e.g. Harmonic Serialism (McCarthy 2008) / Extremely local optimation (Heck, Müller 2007)). And current Minimalism (Chomsky 1995, 2000) also does so.
- Moreover, many syntactic restrictions may be implemented in either way.

Example 1: Θ-criterion

- Θ-criterion: Each argument bears one and only one; θ-role, and each θ-role is assigned to one and only one argument (Chomsky 1981).

(2) a. *Cat likes.
    b. *Mike arrives the dog.

- Representational: If the final representation of the sentence violates the Θ-criterion, the sentence is ungrammatical.
- Derivational: Only arguments can be introduced in θ-positions, only not arguments can be introduces in not θ-positions (Frampton, Gutmann 2002).

Example 2: Movement vs. chain

- The base position of an element is relevant for some properties (semantics, binding, θ), the position after movement to others (feature checking, binding, information structure).
- Properties in the base position may be satisfied derivationally or by a trace / copy.

Example 3: Superiority effects

- In English only the higher *wh*-word moves to Spec,CP.

(3) a. John asked who said what.
  b. *John asked what who said.

(4) a. Who did Mary introduce to whom?
  b. *Who did Mary introduce who to?

- Representational approach: *[$X_{[\alpha]}$ ... $Y_{[\alpha]}$ ... $t_{X_{[\alpha]}}$]
- Derivational: locality restrictions on the search of an appropriate goal

2 Mixed theories

- Current minimalist syntax uses both derivational devices and constraints on representations.
- Let's look at some definitions from (Chomsky 2000) and what he says about derivational / representational approaches
  - One might construe L as a step-by-step procedure for constructing Exps, suggesting that this is how things work as a real property of the brain, not temporally but as part of its structural design. Assumptions of this nature constitute a *derivarional approach* to L.
  - The *strong* derivational approach dispenses with the expression altogether, assuming that information is provided to interface systems "dynamically".
  - A *weak* derivational approach assumes that interface levels exist, allowing "postcyclic" operations that apply to them in whole or in part (deleting the tail of a chain, imposing metrical structure, determining ellipsis and scope, etc.).
  - E is an expression of L iff ... E ... , where ... — ... is some condition on E. One might, then, take L to be a direct definition of the set {Exp}, adopting a *representational* approach.
  - I will adopt the derivational approach as an expository device, though I suspect it may be more than that.
    WHICH derivational approach?!

Derivational elements

- Merge, Agree, Move (cited from Chomsky 2000)
  - The operation *Merge*, which takes two syntactic objects (α, β) and forms K(α, β) from them.
  - A second is an operation we can call *Agree*, which establishes a relation (agreement, Case checking) between an LI α and a feature F in some restricted search space (its *domain*)

- A third operation is *Move*, combining Merge and Agree. The operation Move establishes agreement between α and F and merges P(F) to αP, where P(F) is a phrase determined by F (perhaps but not necessarily its maximal projection) and αP is a projection headed by α. P(F) becomes the specifier (Spec) of or ([Spec, u]).
- Plainly Move is more complex than its subcomponents Merge and Agree, or even the combination of the two, since it involves the extra step of determining P(F) (generalized "pied-piping"). Good design conditions would lead us to expect that simpler operations are preferred to more complex ones, so that Merge or Agree (or their combination) preempts Move, which is a "last resort", chosen when nothing else is possible.

- Exploded Post-syntax (Embick, Noyer 2001; 2007; Arregi, Nevins 2012)
  Three strictly ordered PF operations: Lowering, Linearization, Local Dislocation (Embick, Noyer 2001; 2007)
  - Before Linearization: The derivation operates in terms of hierarchical structures. Consequently, a movement operation that applies at this stage is defined hierarchically. This movement is Lowering; it lowers a head to the head of its complement.
  - After Linearization: The derivation operates in terms of linear order. The movement operation that occurs at this stage, Local Dislocation, operates only in terms of linear adjacency, not hierarchical structure.
- Remnant movement logic – two subsequent movement steps (Ross 1967; Müller 1998)

(5) a. Gelesen hat das Buch keiner.
read AUX ART book.ACC no.one.NOM
'No one read the book.'

b. [$_{VP_2}$ t_1 Ein Buch zum Geburtstag geschenkt] hat sie dem Jason$_1$ t_2
ART book.ACC to.ART birthday give.PTCP AUX she ART J.DAT
'She gave Jason a book to his birthday.'

c. [$_{VP_2}$ Dem Jason$_1$ t_3 zum Geburtstag geschenkt] hat sie ein Buch$_3$ t_2
ART J.DAT to.ART birthday give.PTCP AUX she ART book.ACC
'She gave Jason a book to his birthday.'

Representational elements – interface filters

- Case filter

(6) *NP if NP has phonetic content and has no Case (Chomsky 1981).

- If case features remain active (unvalued / unchecked) by the end of the derivation, the derivation crashes.
- Distribution of overt noun and case, paradigm taken from (Lyutikova 2017).

(7)	a.	Leo decided [(*Lina/himself) to leave].	*NP, -Case
	b.	Leo believed [Lina to be a genius].	NP, +Case (ECM, V)
	c.	Leo decided [for Lina to leave].	NP, +Case (P)
	d.	For Leo to win would be great.	NP, +Case (P)
	e.	*Leo to win would be great.	*NP, -Case

- Unlike other unvalued features, case features don't trigger any operations immediately, but wait for the case assigned to be merged (noted by Frampton, Grutmann 2002).

- Distinctiveness (Richards 2010)

(8) Distinctness
If a linearization statement $\langle\alpha,\alpha\rangle$ is generated, the derivation crashes.

(9) a. I know everyone danced with someone, but I don't know [who] [with whom].
b. I know every man danced with a woman, but I don't know [which man] [with which woman].

(10) a. *I know everyone insulted someone, but I don't know [who] [whom].
b. *I know every man insulted a woman, but I don't know [which man] [which woman]

- Some islands
  - Some otherwise robust restrictions on movement doesn't hold under ellipsis, see examples of island repair in sluicing (Ross 1969).

    (11) I believe the claim that he bit someone, but they don't know who (*I believe the claim that he bit). [Complex NP Constraint, noun complement]

    (12) Irv and someone were dancing together, but I don't know who (*Irv and were dancing together). [Coordinate Structure Constraint]

    (13) She kissed a man who bit one of my friends, but Tom doesn't realize which one of my friends (*she kissed a man who bit). [Complex NP Constraint, relative clause]

    (14) That he'll hire someone is possible, but I won't divulge who (*that he'll hire is possible). [Sentential Subject Constraint]

  - That led to the representational accounts of islands (Merchant 2001; Fox, Lasnik 2003; Merchant 2006). It is not the movement step that is banned, but the created representation doesn't pass the PF-filter. Exact filter differs: Null Conjunct Constraint or diacritic #.
  - Note, that the phenomenon par se is not an argument for the representational syntax, see a derivational analysis in (Müller 2011).

3 Conceptual arguments

Against the representational approach

- Computational efficiency (Frampton, Gutmann 2002):
- Derivations that are doomed to fail at a very early point, in the filter system can get arbitrary long. Not crash-proof system is computationally inefficient.

(15) a. it to be believed Max to be happy
b. *It was expected to seem to be believed Max to be happy.

- Transderivational constraints, such as economy constraints seem to be very costly (Frampton, Gutmann 2002):
  - But an algorithm which includes an "economy condition" filtering out all derivations which are not shortest possible will almost certainly be computationally complex. A math teacher who gave students the task of not only proving certain theorems but proving that their proofs were the shortest possible would be giving students an enormously difficult problem. The teacher would surely have to wait a long time for the homework to be turned in if the students were forced to resort to exhaustive search.
  - Procrastinate (Chomsky 1993; 1995) is an example of a transderivational constraint. Let's look at how it is used to derive Sluicing-COMP generalization:

    (16) In sluicing, no non-operator material may appear in COMP. (Merchant 2001)

(17) a. Who has Max invited?
b. A: Max has invited someone. B: Really? Who (*has)?

- Auxiliary moves not to satisfy a feature on C, but for spell-out reasons. Feature movement is enough to satisfy the requirement of C. Pied-piping of a lexical material is not necessary under ellipsis, because the IP is exempt from VI anyway. Being not necessary, it's banned by Procrastinate.

Against mixed theories (and against the derivational approach)

- Redundancy and lack of restrictiveness (Brody 2002):
  - There is a redundancy built into the architecture of theories that assume that both representations and derivations play a role in the competence theory of narrow syntax.
  - Having both would weaken the theory in the sense of increasing the analytic options available, hence very strong arguments would be needed to maintain that both concept-sets are part of the competence theory of syntax.
  - ... as far as I am aware there are essentially no strong arguments for postulating both concept pairs as part of narrow syntax.
  - Nobody has attempted to show that the results achieved in the less restrictive framework, that apparently involves systematic duplications (a property that is strange even in a minimalist setting, let alone ES), cannot be restated in a non-mixed system that avoids redundancy and lack of restrictiveness.
- A purely derivational theory still involves representations (Brody 2002):
  - By a *purely representational theory* of narrow syntax (or LF) I understand a system that generates the interface level in the mathematical sense of generation. This consists of a set of constraints or principles that determine well-formedness. We could assume that, essentially as in the standard minimalist framework, these constraints can only include bare output conditions and a definition of possible LF structures (that bare output conditions constrain further).
  - A *purely derivational theory* is an ordered series of operations with input and output, where the input may only consist of terminals and the outputs of some other operations.
  - The following three-way distinction will be useful:
    (i) a derivational theory is *non*representational if the derivational operations create opaque objects whose internal elements and composition is not accessible to any further rule or operation;
    (ii) a derivational theory is *weakly* representational if derivational stages are transparent in the sense that material already assembled can be accessed by later principles (i.e. the derivational stages are representations);
    (iii) a derivational theory is *strongly* representational if it is weakly representational and there are constraints on the representations (weak sense) generated.
  - It is clear that derivational theories must be at least weakly representational. Take an object z, the result of merging x and y. At some later step move can only apply to y if z is a transparent rather than an opaque object since otherwise y would not be accessible or even visible for this operation.
  - The derivational theory therefore is at the same time a (weakly) representational theory with multiple (weakly) representational stages instead of just one at the interface.
- The question about derivational or representational approach is actually about the presence of constraints on representations (not representations itself) (Brody 2002).

- What the distinction between weakly and strongly derivational theory really concerns is the question of whether there are constraints that are additional to those captured by the postulated derivational steps (whether we view these latter as representational or derivational constraints) and bare output conditions.

4 Empirical argument for the derivational approach

Interactions between operations

- There are 4 types of interactions of grammatical operations. (Idea goes back to Kiparsky 1973, definitions below are copied from Müller 2014.)
- Feeding:
  - Rule A creates the context in which rule B can apply.
  - If A applies before B, there is feeding of B by A; A feeds B.
  - If A does not apply, either B cannot apply; or it an apply because its context is present independently of A.
- Bleeding:
  - Rule A destroys the context in which rule B can apply.
  - If A applies before B, there is bleeding of B by A; A bleeds B.
  - If A does not apply, either B cannot apply because its context is not present independently of A.
- Counter-Feeding (underapplication):
  - Rule A creates the context in which rule B can apply.
  - If A applies before B, there is feeding of B by A.
  - However, the evidence shows that B has not applied even though A has applied.
  - Therefore, A must have applied after B.
- Counter-Bleeding (overapplication):
  - Rule A destroys the context in which rule B can apply.
  - If A applies before B, there is bleeding of B by A.
  - However, the evidence shows that B has applied even though A has also applied.
  - Therefore, A must have applied after B.

Simpler examples

- Minimalist syntax is all feeding and bleeding. Merge of one element feeds or bleeds Merge of another element.
- Feeding: Merge of $C_{[+\text{wh}]}$ feeds movement of the *wh*-word.
- Feeding: topicalization of the experiencer feeds raising of the subject (Hartman 2011).

(18) a. It is important (to Mary) to avoid cholesterol.
b. Cholesterol is important (*to Mary) to avoid.
c. To Mary, cholesterol is important to avoid.

- Bleeding: Merge of an expletive bleeds the movement of an embedded constituent and vice versa.

(19) a. A man seems to be here.
b. There seems to be a man here.

- Bleeding: VP ellipsis bleeds V-to-T (or Lowering of past to the verb).

(20) John spilled his beer on the floor, so Mary did.

Opaque and transparent interactions

- Feeding and bleeding are claimed to be transparent, i.e. the reasons for application / non-application of an operation is visible from the resulting representation.
- Counter-feeding and counter-bleeding operations are opaque, i.e. the resulting representation doesn't allow to see, why an operation applied or why it didn't.
- Opaque interactions are problematic for pure representational syntax and lead us to the derivational alternative.
- Representational syntax enriches representations to derive more staff, for instance, introduces traces, but it's not completely clear (to me), when and to which extent it helps.

Opaque interactions

- Counter-feeding and counter-bleeding in German parasitic gaps (Heck, Himmelreich 2017).
  - Binding by the indirect object is bled by the direct object:

(21) a. *Wem$_2$ hat der Fritz das Buch [anstatt PG$_2$ zu helfen] weggenommen?
who.DAT has the Fritz the book.ACC instead to help away.taken
'Who did Fritz take the book from instead of helping him?'

b. Was$_2$ hat der Fritz der Maria [anstatt PG$_2$ wegzuwerfen] zu essen angeboten?
what.ACC has the Fritz the Maria.DAT instead away.to.throw to eat offered
'What did Fritz offer Maria to eat instead of throwing it away?'

c. Wem$_2$ hat der Fritz [anstatt PG$_2$ zu helfen] das Buch weggenommen?
who.DAT has the Fritz instead to help the book away.taken
'Who did Fritz take the book from instead of helping him?'

  - Scrambling in German can also bind parasitic gaps. Dative cannot bind the parasitic gap independently of the position of accusative argument. It's counter-feeding.

(22) a. Hans hat Maria$_2$ [ohne PG$_2$ anzuschauen] t$_2$ geküsst.
Hans has Maria.ACC without at.to.look kissed
'Hans kissed Maria without looking at her.'

b. *wenn jemand der Anette$_2$ das Buch [ohne PG$_2$ zu vertrauen] ausleiht
if someone the Anette.DAT the book.ACC without to trust lends
'if someone lends Anette the book without trusting her'

c. *wenn jemand das Buch der Anette$_2$ [ohne PG$_2$ zu vertrauen] ausleiht
if someone the book.ACC the Anette.DAT without to trust lends

  - The intervening indirect object fails to bleed the binding by the direct object. It's counter-bleeding.

(23) a. dass Hans der Maria das Buch$_2$ [ohne PG$_2$ durchzulesen]
that Hans the Maria.DAT the book.ACC without through.to.read
zurückgibt
back.gives
'that Hans returns the book to Maria without reading it through'

b. dass Hans das Buch$_2$ der Maria [ohne PG$_2$ durchzulesen]
that Hans the book.ACC the Maria.DAT without through.to.read
zurückgibt
back.gives
'that Hans returns the book to Maria without reading it through'

- Wanna-construction (Bresnan 1972; Nevins 2011) gives a case of counter-feeding.

(24) a. Who do you want to / wanna help?
b. Who do you want to/ *wanna help Jim?

- Late adjunction (Lebeaux 1988) and Principle C give counter-bleeding.

(25) a. *She$_i$ saw the picture of Kate$_i$.
b. *Which picture of Kate$_i$ did she$_i$ see?

(26) a. *She$_i$ saw the picture that Kate$_i$ hates.
b. Which picture that Kate$_i$ hates did she$_i$ see?

- MCE in Dutch bleeds some types of movement and fails to bleed others (Aelbrecht 2010; 2016; Baltin 2011).

(27) a. *Ik weet niet welke liedjes hij gespeeld heeft, maar ik herinner me wel welk
I know not which songs he played has but I remember me PRT which
liedje hij niet mocht.
song he not was.allowed.to
'I don't know which songs he played, but I do remember which song he wasn't allowed to.'

b. Ik wil naar je optreden komen, maar ik kan niet [~~naar je optreden~~ ~~t~~$_{ik}$
I want to your gig come but I can not to your gig
~~komen~~].
come
'I want to come to your gig, but I can't.'

5 Take-home message

- Derivational vs. representational; filters vs. constrained operations
- The derivational and the representational approaches to syntax are often interchangeable, can equally well derive the data.
- Current minimalism is a mixed theory. Mixed theories are maybe not desirable conceptually.
- Opaque interactions in syntax exist. They require a derivational approach.

References

Google it! If you cannot find something e-mail me.